Sixth Grade Science Curriculum Bundle # 6

Title	Suggested Dates
Genetics	December 7-December 18 (10 days)

Big Idea/Enduring Understanding	Guiding Questions
Organisms pass their traits on to their offspring.	How do living systems reproduce and pass hereditary information to the next generation? How is selective breeding similar to and different from natural processes that determine traits of organisms? Where is genetic material located in a cell?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	Specificity & Examples	Suggested Resources (Read the note above)
6.11 The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. **6.11A** Identify some changes in traits that can occur over several generations through natural occurrence and selective breeding.	Such as: --- Natural occurrence: • Hair color • Eye color • Height, etc. --- Selective breeding • Livestock • Dogs • Cats • Fruit trees, etc.	**Vocabulary**: DNA, Traits, selective breeding, chromosomes, genes, heredity AVID Activity- Writing in Science pages 22-23 "Pre-write and Quickwrite" **Uncovering Student Ideas in Science**, Keeley,Vol. 2, #17, Baby Mice Technology: Mendel's Peas Computer Activity—works very well as a teacher lead activity to explain appearance/disappearance of traits in relation to selective breeding and/or natural occurrence. http://www2.edc.org/weblabs/mendel/mendelInstructions.html http://www.utdanacenter.org/sciencetoolkit/downloads/activities/6_tracking_down_traits.pdf Tracking Down Traits from the Dana Center http://learn.genetics.utah.edu/content/begin/traits/activities/ Trait Resources

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		http://www.usc.edu/org/cosee-west/AprilLectureMaterials/Activities/AnInventoryofMyTraits.pdf My Traits Lab
6.11 The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. 6.11B Identify cells as structures containing genetic material.	Including: --- Cells contain genetic material in the nucleus. • Emphasize components of cell theory—cells come from other cells. • Prokaryotic/eukaryotic—how is genetic material different? • Hierarchy of structure: DNA, gene, chromosome Teacher Note: Focus should be that the passing of a trait comes from cells containing the genetic material. Do NOT teach structure and mechanisms of DNA.	Animal/ Plant Cell Model pg. TE 118 (Region 4-Gateways to Science Grade 6) DNA Extraction Lab- Shared Drive- Science Resources 6th Grade. Or visit: http://mabrymsblog.typepad.com/mrs_jones/files/genes_in_a_bottle.doc Gateway Book TE pages 123—128 SE pages 185-191
6.11 The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. **6.11C** Interpret the role of genes in inheritance.	Including: --- Inherited traits of organisms are passed from parents to the offspring through genes. Teacher note: Emphasis here should be on the idea that traits are inherited by offspring from parents through a cellular mechanism. Do NOT teach Punnett squares.	Genetics with a Smile http://sciencespot.net/Media/gen_smilewkst1.pdf Bunny babies activity (see 6th grade teacher resources)
6.1 Conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. **6.1A** Demonstrate safe practices during field and laboratory investigations.	Including: --- Chemical use and disposal --- Animal Safety --- Safe practices with lab equipment --- Continue to follow District Safety Contract --- Continue to operate in accordance with the Texas Safety Standards Teacher Note: Safety skills and process TEKS should be embedded and reinforced throughout the year.	Texas Safety Standards
6.1 Conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. **6.1B** Make wise choices in the use and conservation of resources and the disposal and recycling of materials.	Including: --- Recycling of lab materials	

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6.2 Uses scientific methods during fields and laboratory investigations. **6.2A** Plan and implement descriptive and simple experimental investigations, including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology.	Including: --- Independent and dependent variables --- Controls --- Procedures --- Materials --- Using a standard lab report format Teacher Note: Emphasize that not all parts of scientific method may be used for every investigation and the ones that are used depends on the task.	AVID Activity- Writing in Science pages 55-94 "Experimental Design Lab Report Activities"
6.2 Uses scientific methods during fields and laboratory investigations. **6.2B** Collect information by observing and measuring.	Including: --- Collecting information using the metric system • Introduce metric system --- Pre-AP: Emphasis on using probeware in a variety of situations Teacher Note: Measurement exercises should progress across the middle school grade levels and begin by developing conceptual understanding. In sixth grade it is most important to learn the different metric units (meter, kilogram, liter, etc.) and develop an intuitive sense of the size of them (a meter is about the height of a doorknob, a paperclip is about 1 gram, etc.) New TEK 2010-2011-*collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.*	AVID Activity- Writing in Science pages 26-28 " Observation Narrative"
6.2 Uses scientific methods during fields and laboratory investigations. **6.2C** Analyze and interpret information to construct reasonable explanations from direct and indirect evidence.	Including: --- Look for trends and/or patterns specific in the data and/or graph	AVID Activity- Writing in Science pages 29-30 "Comparative Analysis"
6.2 Uses scientific methods during fields and laboratory investigations. 6.2D Communicate valid conclusions.	Including: --- Relate conclusion to hypothesis/problem --- Identify sources of error/ways to improve investigation --- Communicate conclusion effectively in writing	AVID Activity- Reading in Science pages 111-132 " Additional Active Reading Graphic Organizers"

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6.2 Uses scientific methods during fields and laboratory investigations. **6.2E** Construct simple graphs, tables, maps, and charts using tools including computers to organize, examine and evaluate data.	Including: --- Organization of data • data charts --- Graphing data-bar graph & line graph • label each axis with name and units • provide a descriptive title --- Identify appropriate use of different types of data representation	
6.3 Uses critical thinking and scientific problem solving to make informed decisions. 6.3A Analyze, review, and critique scientific explanations, including hypotheses and theories as to their strengths and weaknesses using scientific evidence and information.	Teacher Note: --- Emphasize the nature of scientific explanations: testability, repeatability, evidence, predictive nature --- Relate to labs throughout the year	
6.3 Uses critical thinking and scientific problem solving to make informed decisions. **6.3B** Draw inferences based on information related to promotional materials for products and services.	Such as: ---promotional research related genetics	
6.3 Uses critical thinking and scientific problem solving to make informed decisions. **6.3C** Represent the natural world using models and identify their limitations.	Such as: --- Conceptual • Family tree charting specific traits • Scientific Method --- Mathematical • Graphs to make predictions --- Physical • DNA Strand Teacher Note: *Use models to represent aspects of the natural world and identify advantages and limitations of models such as size, scale, properties, and materials.*	http://www.iwaswondering.org/nancy_print.html Gene Tree Use the Gene Tree to make predictions http://www.ucmp.berkeley.edu/glossary/gloss3/dna.html DNA Model
6.3 Uses critical thinking and scientific problem solving to make informed decisions. **6.3D** Evaluate the impact of research on scientific thought, society, and the environment.	Such as: --- Current events on genetics	AVID Activity: Writing in Science page 24 “Brief Autobiography”.

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6.3 Uses critical thinking and scientific problem solving to make informed decisions. **6.3E** Connect Grade 6 science concepts with the history of science and contributions of scientists.	Such as: --- Darwin --- Mendel ---Other scientists (genetic engineers, doctors, etc.)	
6.4 Knows how to use a variety of tools and methods to conduct science inquiry. **6.4A** Collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes.	Including: --- Journals/notebooks --- Data collection tools as appropriate Teacher Note: *Use appropriate tools to collect, record, and analyze information, including journals/notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot plates, test tubes, triple beam balances, microscopes, thermometers, calculators, computers, timing devices, and other equipment as needed to teach the curriculum*	
6.4 Knows how to use a variety of tools and methods to conduct science inquiry. **6.4B** Identify patterns in collected information using	Including: --- Use descriptive statistics including frequency, range, mean, median, and mode Teacher Note: Data needs to be in metric system and decimals rather than fractions.	
6.5 The student knows that systems may combine with other systems to form a larger system. **6.5B** Describe how the properties of a system are different from the properties of its parts.	Including: --- Systems -properties of parts and properties of whole: • Chromosomes • Genes • Heredity	